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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,312	05/01/2006	Peter Bryan Malcolm	0112634.00122US1	4877
5073 7590 03/10/2010 BAKER BOTTS L.L.P. 2001 ROSS AVENUE SUITE 600 DALLAS, TX 75201-2980				
EXAMINER HOANG, SON T				
ART UNIT 2165		PAPER NUMBER		
NOTIFICATION DATE 03/10/2010		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail1@bakerbotts.com
glenda.orrantia@bakerbotts.com

Office Action Summary

Application No.

10/534,312

Applicant(s)

MALCOLM, PETER BRYAN

Examiner

SON T. HOANG

Art Unit

2165

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 and 81-86 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-77 and 81-86 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ ~~Notes of Informal Patent Application~~
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This communication is in response to the amendment filed on December 22, 2009.

Claims 1, 28-29, 52, 54, and 77 are amended.

Claims 78-80 are canceled.

Claims 1-77, and 81-86 are pending.

Response to Arguments

2. Applicant's arguments with respect to the 35 U.S.C. 102(b) and 103(a) rejections of the pending claims have been fully considered but are moot in view of the new ground of rejections presented hereon.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 28-29, 52, 54, 77, and 81-86** are rejected under 35 U.S.C. 102(b) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*).

Regarding **claim 1**, Crocitti clearly shows and discloses a method of operating a data processing system, the system comprising one or more application programs requiring persistent data storage for data files of application data, a plurality of physical storage devices each accessible via a computer network to one or more computers executing the application programs, and a broker program (*Abstract and Figures 1-2*), wherein the method comprises:

receiving, by the broker program, a request from an application program for storage of a data file of application data of the application program (*usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program* (http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci507192_00.html). *In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities*), the request including an expiry date set by the application program, beyond which the data file is no longer required and

may be deleted (*The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]*),

selecting, by the broker program, one of the plurality of physical storage devices to store the data file according to the expiry date of the data file, and a state of the physical storage device (*This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]*).

Margolus discloses:

preventing, by the broker program, the data file from being deleted until the expiry date has been reached (*assigning finite expiration times to entity versions based on information supplied by the storage client, before which times deletion is prohibited and after which times deletion is allowed, [0036]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Margolus with the teachings of Crocitti for the purpose of which a disk-based distributed data storage system is

organized for protecting historical records of stored data entities ([Abstract] of Margolus).

Regarding **claim 28**, Crocitti clearly shows and discloses a method of operating a data processing system to store data (*Abstract*), comprising:

receiving a request from an application program, among one or more application programs, for storage of a data file of application data of the application program (*usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program* (http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci507192,00.html). *In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities*), the request including an expiry date set by the application program, beyond which the data file is no longer required and may be deleted (*The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]*);

determining one or more characteristics of the application data file, including the expiry date; monitoring the status of storage devices in a plurality of physical storage devices (*the definition of the usage constraints or of the characteristics of the*

information stored can be put in place so that the choice of storage means on which this particular information is to be stored is conditioned by these constraints, [0026]); and

selecting a physical storage device from the plurality of physical storage devices to store the data file according to the expiry date of the data file, and a state of the storage device, wherein the data file is stored on the selected physical storage device (This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]).

Margolus discloses:

preventing, by the broker program, the data file from being deleted until the expiry date has been reached (assigning finite expiration times to entity versions based on information supplied by the storage client, before which times deletion is prohibited and after which times deletion is allowed, [0036]).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Margolus with the teachings of Crocitti for the purpose of which a disk-based distributed data storage system is

organized for protecting historical records of stored data entities ([Abstract] of Margolus).

Regarding **claim 29**, Crocitti clearly shows and discloses a system for storing data (*Figures 1-2*) comprising:

a plurality of physical storage devices; a processor in communication with the plurality of physical storage devices (*Figures 1-2*), wherein the processor:

receives a request for storage of a data file of application data from one or more application programs requiring persistent data storage (*usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program* (http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci507192,00.html). *In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities*), the request including an expiry date set by the application program, beyond which the data file is no longer required and may be deleted (*The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]*); and

selects one of the plurality of physical storage devices to store the data file according to the expiry date of the data file and a state of the physical storage device, such that the data file is stored in the selected physical storage device (*This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]*).

Margolus discloses:

preventing, by the broker program, the data file from being deleted until the expiry date has been reached (*assigning finite expiration times to entity versions based on information supplied by the storage client, before which times deletion is prohibited and after which times deletion is allowed, [0036]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Margolus with the teachings of Crocitti for the purpose of which a disk-based distributed data storage system is organized for protecting historical records of stored data entities ([Abstract] of Margolus).

Regarding **claim 52**, Crocitti clearly shows and discloses a system for storing data (*Figures 1-2*), comprising:

one or more application programs requiring persistent data storage for data files of application data (*Abstract*);

a plurality of physical storage devices each accessible via a computer network to one or more computers executing the application programs (*Figures 1-2*); and

a broker program configurable to:

receive a request from an application program for storage of a data file of application data of an application program (*usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program*

(http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci507192,00.html). *In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities*), the request including an expiry date set by the application program, beyond which the data file is no longer required and may be deleted (*The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]*);

select one of the plurality of physical storage devices to store the data file according to the expiry date of the data file and a state of the plurality of physical storage device (*This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]*).

Margolus discloses:

preventing, by the broker program, the data file from being deleted until the expiry date has been reached (*assigning finite expiration times to entity versions based on information supplied by the storage client, before which times deletion is prohibited and after which times deletion is allowed, [0036]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Margolus with the teachings of Crocitti for the purpose of which a disk-based distributed data storage system is organized for protecting historical records of stored data entities ([Abstract] of Margolus).

Regarding **claim 54**, Crocitti clearly shows and discloses a computer program product for controlling a computer in a data storage system, the computer being

operable to receive requests from one or more application programs, running on one or more computers, and requiring persistent data storage for data files of application data, and operable to monitor a plurality of physical storage devices (*Figures 1-2*), the computer program product comprising:

a recording medium readable by the computer, having program code stored thereon which when executed on the computer configures the computer to perform the steps of (*Figures 1-2*):

receiving a request for storage of a data file of application data from an application program (*usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program (http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci507192,00.html).* In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities), the request including an expiry date set by the application program, beyond which the data file is no longer required and may be deleted (*The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]*);

selecting one of the plurality of physical storage devices to store the data file according to the expiry date of the data file and the state of the physical storage device (*This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]*).

Margolus discloses:

preventing, by the broker program, the data file from being deleted until the expiry date has been reached (*assigning finite expiration times to entity versions based on information supplied by the storage client, before which times deletion is prohibited and after which times deletion is allowed, [0036]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Margolus with the teachings of Crocitti for the purpose of which a disk-based distributed data storage system is organized for protecting historical records of stored data entities ([Abstract] of Margolus).

Regarding **claim 77**, Crocitti clearly shows and discloses a computer program product for controlling a computer in a data storage system, the computer program

product comprising a recording medium readable by the computer, having program code stored thereon which when executed on the computer configures the computer (Figures 1-2) to perform the steps of:

receiving a request from an application program, among one or more application programs, for storage of a data file of application data of the application program *(usage constraints are taken into account upon a request (30, 40) asking for the storage of new information originating from an interactive service provider (4). A request (30, 40) can be issued by the service provider (4), [0026]-[0027]. By definition, an "application program" is any program designed to perform a specific function directly for the user or, in some cases, for another application program*
(http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_qci507192,00.html). In other words, a "service provider" can also be interpreted as application program since it is an entity that provides services for other entities), the request including an expiry date set by the application program, beyond which the data file is no longer required and may be deleted (The constraint or the information item relating to the date of expiry or the duration of validity is provided either by the service provider, upon the storage request, [0048]);

determining one or more characteristics of the application data, including the expiry date; monitoring the status of storage devices in a plurality of physical storage devices *(the definition of the usage constraints or of the characteristics of the information stored can be put in place so that the choice of storage means on which this particular information is to be stored is conditioned by these constraints, [0026]);*

selecting a physical storage device from the plurality of physical storage devices to store a data file of application data according to the expiry date of the data file and a state of the storage device, wherein the data file is stored on the selected physical storage device (*This processing module (11) has access to all the information relating to the constraints of usage of the information item to be stored, which item is contained in the request. This module also has access to the characteristics of the storage means (21, 22, 23) relating in particular to the available space remaining on the various storage means and the processing speed. The processing module (11) then carries out a comparison between the constraints of storage of the information item and the characteristics of the storage means (21, 22, 23), [0028]*).

Regarding **claims 81-86**, Crocitti further discloses selecting of which one of the plurality of physical storage devices will be used to store the data files comprises selecting a storage device based on the amount of free space available in the storage devices so that the selected physical storage device is filled and eligible for re-use as soon as possible (*Thus, the quantity of storable information, the access time and the speed of processing or the rate of transfer of the stored information are different from one storage means to another. The characteristics of the storage means (21, 22, 23) constitute constraints (212, 222, 232) which interfere in the choice of the allocation (211, 221, 231) of an item of information in the storage means when a new item of information or new data need to be stored, [0024]*).

5. **Claims 2, 4, 7-10, 12, 18-25, 30, 32, 35-38, 40, 45-49, 53, 55, 57, 60, 65, and 70-74** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*).

Regarding **claims 2, 30, and 55**, Crocitti, as modified by Margolus, does not disclose monitoring, using the broker program, the remaining storage space available on each of the storage devices, to distinguish between in-use storage devices which have had data files written to them and empty storage devices which have not.

However, Clifton discloses monitoring, using the broker program, the remaining storage space available on each of the storage devices, to distinguish between in-use storage devices which have had data files written to them and empty storage devices which have not (*Volume groups can be assigned the attribute value of release/no release. After data set allocation, unused allocated space is released in cylinder quantities if the data set is not empty, [Column 13, Lines 46-49]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Clifton with the teachings of Crocitti, as modified by Margolus, for the purpose of accomplishing the assignment of

newly received data sets to the best storage volume by determining the best match of the data set to the available volumes ([Abstract] of Clifton).

Regarding **claims 4, 32, and 57**, Clifton further discloses:

monitoring how much data is waiting to be written to each storage device, to detect an overload condition in the process of writing the data (*There exists certain instances where a volume may not be a very good candidate for the current request because there is a previous request using or waiting in the queue to use the volume in an exclusive fashion. These volumes are called job wait volumes. The selection of this volume will cause this request to wait for the conflicting request to be completed. If the WAIT flag is activated, this signifies that the volume is selected for a request that would cause this request to wait because the volume was not completely ready for selection,* [Column 29, Lines 13-22]); and

selecting, if an overload condition is detected for a storage device selected for storage, a different storage device for storage (*From the volumes remaining, an attempt will be made to select a volume that is not a job wait volume. If any volumes exist that are not a job wait volume, then one of these volumes will be selected,* [Column 29, Lines 60-64]).

Regarding **claims 7, 35, and 60**, Clifton further discloses selecting another storage device for storage, if the expiry date of the application data is outside of the predetermined range of the latest expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the*

current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].

Regarding **claims 8**, and **36**, Clifton further discloses storing for each of the storage devices a target expiry date, and selecting which of the storage devices to use in dependence on a comparison of the expiry date and the target expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claims 9**, and **37**, Clifton further discloses preventing application data from being stored on a storage device, if the target expiry date for that storage device is earlier than the expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first*

decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].

Regarding **claims 10, and 38**, Clifton further discloses preventing application data from being stored on a storage device if the target expiry date for that storage device is earlier than the expiry date by more than a predetermined margin (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claims 12, 40, and 65**, Clifton further discloses after the latest expiry date has passed, erasing the contents of the storage device (*The volume expiration date is the date of the allocation plus a retention period. Nonspecific data set allocations will not allocate a data set to a volume if the expiration of the data set date exceeds that of a volume. When the volume expires, all data sets residing on that volume may be destroyed, [Column 13, Line 63 – Column 14, Line 3]].*

Regarding **claims 18, 45, and 70**, Clifton further discloses notifying the application program of the storage device used to store the data file as determined by the broker program, such that the application program can store means to identify the device (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes*, [Column 6, Lines 15-23]).

Regarding **claim 19**, Clifton further discloses the data files are retrieved from the storage device by the application program directly via the computer network and without reference to the broker program (*The mass storage system responds to the program operating system of its host computers in the virtual direct access mode. That is, to the host computer, the mass storage system appears as a plurality of disk drives directly available to the host computer. The operating system of the host computer assigns a disk virtual volume to a system unit. When a virtual volume is mounted in the mass storage system, it is also assigned to a unit address. The virtual unit address is used to designate the logical address of each virtual volume and is used in staging data and in locating the data on a staging pack*, [Column 2, Lines 52-58]).

Regarding **claims 20, 46, and 71**, Clifton further discloses determining, using the broker program, the directory location for storage of the data file on the storage devices (*The selection process selects a storage volume according to the information describing*

the data set that is to be stored. The selection apparatus and process weighs the factors describing the data set and searches each virtual volume in a specific group for the best storage location for the data set under consideration, [Column 5, Lines 11-17]).

Regarding **claim 21**, Clifton further discloses creating, using the broker program, the directory entry for the data file in the directory location in anticipation of data being written to the file by the application program requesting storage (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes, [Column 6, Lines 15-23]*).

Regarding **claims 22, 47, and 72**, Clifton further discloses notifying, using the broker program, the directory location of the data file to the application program for storage by the application program (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes, [Column 6, Lines 15-23]*).

Regarding **claim 23**, Clifton further discloses the directory entry for the data file in the directory location is created by the application program prior to data being written by it (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes*, [Column 6, Lines 15-23]).

Regarding **claims 24, 48, and 73**, Clifton further discloses the state of the storage devices includes the current availability of such devices for data to be written thereto (*From the volumes remaining, an attempt will be made to select a volume that is not a job wait volume. If any volumes exist that are not a job wait volume, then one of these volumes will be selected*, [Column 29, Lines 60-64]).

Regarding **claims 25, 49, and 74**, Clifton further discloses the state of the storage devices includes the amount of free space available in the storage devices (*The SPACECK program calculates the free space on the volume taking into account the reserved space on each volume. A volume is rejected if there is not sufficient space in the volume and the process returns to look at the next volume*, [Column 27, Lines 10-18]).

Regarding **claim 53**, Clifton further discloses an Application Program Interface running on the one or more computers to pass commands to and from the broker

program and the application program (*A special command is issued to interface with the storage system containing the virtual volume location. The request is placed on the storage volume control queue which in turn sends a request to a volume selection module where the actual selection process takes place, ([Column 5, Lines 6-11]).*

6. **Claims 3, 5, 11, 15-17, 31, 33, 39, 43-44, 56, 58, 61-64, and 68-69** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*), and further in view of Leonhardt (*Pub. No. US 2002/0188592, filed on June 11, 2001; hereinafter Leonhardt*).

Regarding **claims 3, 5, 31, 33, 56, and 58**, Crocitti, as modified by Margolus and Clifton, does not explicitly disclose the selecting step comprises selecting in-use storage devices in preference to empty storage devices.

However, Leonhardt discloses the selecting step comprises selecting in-use storage devices in preference to empty storage devices (*if the data attributes as defined by storage management policy indicates that the data set is a candidate to reside on a tape cartridge, then a tape cartridge with expired data on it must be selected to write the data set to. The tape cartridge selected can be one which is completely void of data sets, or the tape cartridge could contain some data sets which have not yet expired and the space available on that tape cartridge can be used to write the current data, [0059]).*

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Leonhardt with the teachings of Crocitti, as modified by Margolus and Clifton, for the purpose of providing a management system which presents to host processors a virtual data storage image having a desired storage attribute for a particular data storage application by combining physical data storage devices in an arrangement suitable for providing the desired storage attribute ([0001] of Leonhardt).

Regarding **claims 11, 39, and 64**, Leonhardt further discloses after the data file has been written to the storage device, preventing the file from being modified or deleted until the expiry date has passed (*management software 42 further performs data expiration processing. It is typical for data sets to have an inherent expiration date which defines a point in time at which the data contained in the data set is no longer valid. When data sets reach their expiration data, they will be deleted, [0060]*).

Regarding **claims 15, 43, and 68**, Leonhardt further discloses the characteristics of the data to be stored include the application program which requires its storage (*an outboard storage manager is operable with the plurality of physical data storage devices for presenting to the host processor a virtual data storage image having a desired data storage attribute for a particular data storage application, [0011]*).

Regarding **claims 16, 44, and 69**, Leonhardt further discloses the characteristics of the data to be stored include the size of the application data (*The attributes or storage policies of the individual data sets must be understood by outboard storage*

manager 10 in order to make intelligent decisions about placement and movement of the data sets. Some relevant data set attributes and policies include data set size, [0044]).

Regarding **claim 17**, Leonhardt further discloses writing the application data to and/or reading the application data from the storage devices directly using he application programs via the computer network (*an outboard storage manager is operable with the plurality of physical data storage devices for presenting to the host processor a virtual data storage image having a desired data storage attribute for a particular data storage application, [0011]. See Figure 1 for the client/server structure).*

Regarding **claim 61**, Clifton further discloses storing for each of the storage devices a target expiry date, and selecting which of the storage devices to use in dependence on a comparison of the expiry date and the target expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]).*

Regarding **claim 62**, Clifton further discloses preventing application data from being stored on a storage device, if the target expiry date for that storage device is

earlier than the expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claim 63**, Clifton further discloses preventing application data from being stored on a storage device if the target expiry date for that storage device is earlier than the expiry date by more than a predetermined margin (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

7. **Claims 6, 34, and 59** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*), and further in view of Baumann et al. (*Pub. No. US Pub. No. US 2002/0078077, published on June 20, 2002; hereinafter Baumann*).

Regarding **claims 6, 34, and 59**, Crocitti, as modified by Margolus, does not disclose the limitations of these instant claims.

However, Clifton teaches storing, for each storage device, the latest expiry date of data files stored on that device, or of data files that are to be stored; and permitting application data to be stored on a storage device if its expiry date is within a predetermined range of the latest expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]*).

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Clifton with the teachings of Crocitti, as modified by Margolus, for the purpose of accomplishing the assignment of newly received data sets to the best storage volume by determining the best match of the data set to the available volumes ([Abstract] of Clifton).

Crocitti, as modified by Margolus and Clifton, does not disclose application data with similar expiry dates can be stored together and when such similar expiry dates have passed the storage device can be erased and re-used.

However, Baumann discloses application data with similar expiry dates can be stored together and when such similar expiry dates have passed the storage device can be erased and re-used *(the software objects are grouped together by their expiration times and their expiration handled in groups. Thus, if the expiration times of a number of software objects fall within a time interval, they may be held in a container corresponding to such time interval. At or near the end of the time interval of the container, all of the references to the objects in the container may be removed, [0009])*.

It would have been obvious to an ordinary person skilled in the art at the time of the invention was made to incorporate the teachings of Baumann with the teachings of Crocitti, as modified by Margolus and Clifton, for the purpose of using expiration notification events and object references to indicate when a software object has expired ([Abstract] of Baumann).

8. **Claims 13-14, 41-42, and 66-67** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of McMurdie et al. (*Pat. No. US 6,882,795, filed on October 30, 2000; hereinafter McMurdie*).

Regarding **claims 13, 41, and 66**, Crocitti, as modified by Margolus, does not explicitly disclose the characteristics of the data to be stored include a classification of the content of the application data.

However, McMurdie discloses the characteristics of the data to be stored include a classification of the content of the application data (*once the client application 202 has been provided enumerated formats, a format has been selected as active, and the client application 202 has been provided the application format interface identifications, the disc master interface 222 then provides the client application 202 with an enumerator that enumerates the recording devices 280 supported by the system, and presently connected to the system*, [Column 5, Line 66 → Column 6, Line 5]).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of McMurdie with the teachings of Crocitti, as modified by Margolus, for the purpose of recording data with minimal data interruption, even with very large and complex audio and video files, by selecting recording devices based on the selected data format ([Column 3, Lines 50-55] of McMurdie).

Regarding **claims 14, 42, and 67**, McMurdie further discloses:

storing for each of the storage devices, a target content type (*As shown in Figure 3, in addition to the IRedbookDiscMaster 224 and the IJolietDiscMaster 226 described above, several additional application format interfaces are configured to the exemplary system. The application format interfaces illustrated include IISO9660DiscMaster 227a for ISO9660-format data, IUFDiscMaster 227b for UDF-format data, ICDEExtraDiscMaster 227c for CD Extra-format data, IPhotoCDDiscMaster 227d for photographic data, ICD3DiscMaster 227e for audio data, IVideoCDDiscMaster 227f for video data, [Column 5, Lines 19-25]*);

comparing the classification of the content of the application data and the target content type (*The disc master interface 222 provides the client application 202, as represented through dashed line 210, an enumerator that enumerates the formats supported and provides identification of the application format interfaces present, [Column 47-51]*); and

preventing the application data from being stored in a storage device if the target content type for that device and the classification do not match (*The disc master 220 contains all of the application format interfaces that are supported by a system, [Column 5, Lines 1-2]. It is well inherent that for files with unsupported format, the files will not be stored in these devices*).

9. **Claims 26, 50, and 75** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of Gotoh et al. (*Pub. No. US 2003/0079084, filed on March 28, 2002; hereinafter Gotoh*).

Regarding **claims 26, 50, and 75**, Crocitti, as modified by Margolus, does not explicitly disclose the state of the storage devices includes the rate at which data is being read from and/or written to such devices.

However, Gotoh discloses the state of the storage devices includes the rate at which data is being read from and/or written to such devices (*the storage control device 10 may be connected with a plurality of host processors 20. In this case, the response time upper limit value of each the files will be stored for each host processor, and storage device(s) to where the files are to be stored will be selected for each host processor 20, or, when there is an input/output request of a certain file from the host processor 20, the upper limit value of the file and the response time of each storage device will be compared and the processing priority of the relevant input/output request will be determined according to the comparison result, [0059]*).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Gotoh with the teachings of Crocitti, as modified by Margolus, for the purpose of providing a storage control device which stores

and manages data sent from a host processor connected to communicate therewith, and optimizing a operational form of the storage control device ([0002] of Gotoh).

10. **Claims 27, 51, and 76** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crocitti (*Pub. No. US 2001/0006403, published on July 5, 2001; hereinafter Crocitti*) in view of Margolus et al. (*Pub. No. US 2004/0167898, filed on February 26, 2003; hereinafter Margolus*), and further in view of Basham et al. (*Pub. No. US 2003/0050729, filed on September 10, 2001; hereinafter Basham*).

Regarding **claims 27, 57, and 76**, Crocitti, as modified by Margolus, does not explicitly disclose monitoring the status of the storage devices, detecting when new storage devices have been added, and making these available for storage.

However, Basham discloses monitoring the status of the storage devices, detecting when new storage devices have been added, and making these available for storage (*Figure 8 shows the process of adding a physical drive including the steps of making this physical drive ready and available for storage by configuring it for a storage library, [0066]*).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Basham with the teachings of Crocitti, as modified by Margolus, for the purpose of providing an automated data storage library which stores portable data storage cartridges in storage shelves and transports the portable data storage cartridges between the storage shelves and the data storage

drives for mounting and demounting the portable data storage cartridges at the data storage drives ([0002] of Basham).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Son T. Hoang whose telephone number is (571) 270-1752. The Examiner can normally be reached on Monday – Friday (7:00 AM – 4:00 PM).

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Neveen Abel-Jalil can be reached on (571) 272-4074. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Son T Hoang/
Examiner, Art Unit 2165
March 2, 2010

/Neeven Abel-Jalil/
Supervisory Patent Examiner, Art Unit 2165